

Claims

1. A camera comprising  
a support structure;  
5 a lens holder holding at least one lens;  
a suspension for mounting said lens holder on the support structure to allow  
relative movement of the lens holder and the support structure; and  
an actuator for moving said lens holder,  
wherein the suspension includes two link elements each connected at a first end  
10 to the support structure by a pivotal connection and at the other, second end to the lens  
holder by a pivotal connection, the pivotal connections allowing pivoting of the  
respective link element around a respective pivot axis, all the pivot axes being parallel,  
and the extent of the two link elements perpendicular to their respective pivot axes being  
parallel and of equal length.  
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2. A camera according to claim 1, wherein the suspension further includes  
a first attachment element attached to the support structure, the pivotal  
connections at the first end of each link element being between the first attachment  
element and the link elements, and  
20 a second attachment element attached to the lens holder, the pivotal connections  
at the second end of each link element being between the second attachment element and  
the link elements.
3. A camera comprising  
25 a support structure;  
a lens holder holding at least one lens;  
a suspension for mounting said lens holder on the support structure to allow  
relative movement of the lens holder and the support structure in a movement direction;

and

an actuator for moving said lens holder,

wherein the suspension comprises at least two pivotal linkages connected in series between the support structure and the lens holder and interconnected within the series by at least one respective intermediate element, the pivotal linkages being oriented with respect to each other so that the relative movements between the ends of each pivotal linkage in a direction perpendicular to the movement direction compensate for one another,

each pivotal linkage comprising two link elements each having a pivotal connection at a first end of the linkage and a second pivotal connection at the other, second end of the linkage, all the pivotal connections allowing pivoting of the respective link element around a respective pivot axis, all the pivot axes being parallel, and the extent of the two link elements perpendicular to their respective pivot axes being parallel and of equal length.

4. A camera according to claim 3, wherein the suspension consists of two pivotal linkages of the same length arranged antiparallel to one another.

5. A camera according to claim 3 or 4, wherein the suspension further includes a first attachment element attached to the support structure, the pivotal connections at the first end of each link element in the linkage at one end of the series being between the first attachment element and the link elements, and

a second attachment element attached to the lens holder, the pivotal connections at the second end of each link element in the linkage at the other end of the series being between the second attachment element and the link elements.

6. A camera according to any one of claims 2, 3, 4 or 5, wherein all said elements of said suspension are formed integrally from one piece of material.

7. A camera according to claim 6, wherein said pivotal connections are formed by portions of said piece of material having a smaller thickness than the remainder of said piece of material.

5 8. A camera according to claim 7, wherein the thickness of the link elements tapers towards said pivotal connections.

9. A camera according to any one of the preceding claims, wherein the link elements are made of plastics material.

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10. A camera according to any one of the preceding claims, wherein the pivot axes of the pivotal connections extend around the lens holder.

11. A camera according to any one of claims 1 to 9, wherein the pivot axes of the  
15 pivotal connections extend outwardly of the lens holder.

12. A camera according to any one of the preceding claims, wherein the pivotal connections extend along a length which exceeds a tenth of the diameter of the lens holder.

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13. A camera according to any one of the preceding claims, wherein actuator extends around the lens holder leaving a single gap and the suspension is located in said gap.

14. A camera according to any one of the preceding claims, wherein the suspension  
25 connects the support structure and the lens holder within a sector of less than 90 degrees around a central axis of said lens holder.

15. A camera according to any one of the preceding claims, wherein the lens holder

is force-coupled to the housing exclusively through the suspension and the actuator.

16. A camera according to any one of the preceding claims, wherein the pivotal connections allow an amount of rotational motion limited to less than 20 degrees.

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17. A camera according to any one of the preceding claims, wherein the link elements extend across the entire width of the lens holder.

18. A camera according to any one of the preceding claims, wherein the actuator is  
10 an electro-active actuator.

19. A camera according to claim 18, wherein the actuator is a ceramic actuator.

20. A camera according to claim 18 or 19, wherein the actuator is a bender extending  
15 in a helix around an axis which is curved.

21. A camera comprising  
a support structure;  
a lens holder holding at least one lens;  
20 a suspension for mounting said lens holder on the support structure to allow relative movement of the lens holder and the support structure; and  
an actuator for moving said lens holder,  
wherein the suspension includes at least one pivotal linkage comprising two link  
elements each having a pivotal connection at a first end of the linkage and a second  
25 pivotal connection at the other, second end of the linkage, all the pivotal connections allowing pivoting of the respective link element around a respective pivot axis, all the pivot axes being parallel, and the extent of the two link elements perpendicular to their respective pivot axes being parallel and of equal length.

22. A camera according to claim 21, wherein the suspension comprises a single pivotal linkage connected at a first end to the support structure and at the other, second end to the lens holder

- 5 23. A camera according to claim 22, wherein the suspension comprises at least two pivotal linkages connected in series between the support structure and the lens holder and interconnected within the series by at least one respective intermediate element, the pivotal linkages being oriented with respect to each other so that the relative movements between the ends of each pivotal linkage in a direction perpendicular to the movement  
10 direction compensate for one another.